

**REMARKS****I. Status**

Claims 1-42 are all the claims pending in the application.

The Request for Continued Examination (RCE) under 37 C.F.R. § 1.114 has been accepted and the finality of the Action withdrawn pursuant to 37 C.F.R. § 1.114. The Amendment filed on August 23, 2010 has been entered.

At page 2 of the Action, under the heading “Response to Arguments”, the Examiner states:

The applicant states that claims 1, 5, and 16 have been amended and that claims 42-46 are new. The examiner has reviewed the case file and these claims have not been amended or added as argued by the applicant. In 6/22/2010 a claim amendment after Final was submitted. This amendment was not entered by the examiner in the Advisory Action dated 7/12/2010. On 8/23/2010 a new set of claims was filed with a Request for [Reexamination]. These claims only added new claim 42 and do not add new claims 43-46 or amend claims 1, 5, and 16. No additional claim filings have occurred. Should the applicant decide to enter subsequent amendments the examiner notes the comments regarding potential 112 2nd errors as discussed in the 7/12/2010 advisory action.

Applicants note that the Examiner is referring to remarks presented in the Amendment filed June 22, 2010, which, as correctly noted by the Examiner was not entered. As also correctly noted by the Examiner a new set of claims was presented in the Amendment filed on August 23, 2010, with a RCE requesting entry of the Submission. For clarification of the record, Applicants note that there was no request for entry of the previously unentered claim amendments submitted after Final rejection on June 22, 2010, which were denied entry.

**II. Response to Claim Rejections - 35 USC § 112**

**A.** Claims 22 and 40 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite with respect to the definition of nkat/g.

Applicants traverse and respectfully request the Examiner to reconsider in view of the following remarks.

In the present invention, the laccase activity was determined using ABTS (2,2'-azino-bis(3-ethylbenzthiazoline-6-sulphonic acid)) as a substrate. The activity of laccase was measured at room temperature using pH 4.5 as the determination pH and expressed in nanokatals (nkat). The SI unit of catalytic activity is defined as the amount of enzyme activity that converts 1 mol of substrate per second in the assay conditions. The specific conditions of each chemical reaction are described in the working examples so that enzyme activity can be calculated in katals for each condition.

In view of the foregoing, a person having ordinary skill in the art would be able to ascertain the definition of enzyme activity with respect to the present invention. The document by Niku-Paavola et al. [1988]<sup>1</sup> previously submitted to provide evidence of what is known in the art. In the document by Niku-Paavola et al. [1988], laccase activity is calculated in the same way as that of the present invention.

In view of the above, it is respectfully requested that the § 112, second paragraph, of claims 22 and 40 be withdrawn.

**III. Response to Claim Rejections - 35 USC § 102****A. Goodell**

Claims 1-6, 9-15, 23-29, 31-34 and 41-42 are rejected under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. 2003/0186036 GOODELL et al., hereinafter GOODELL, essentially for the reasons of record, and further as evidenced by Photostability of Quercetin under Exposure to UV irradiation by VICENTINI et al.,

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<sup>1</sup> Niku-Paavola M-L, Karhunen E, Salola P, Raunio V. Lignolytic enzymes of the white-rot fungus *Phlebia radiata*. Biochem. J. 1988;254: 877-884 already of record.

hereinafter VINCENTINI and by Antibacterial effect of phenolic compounds from different wines by VAQUERO, hereinafter VAQUERO.

Goodell is relied on as in the previous Office Actions.

The Examiner relies on Vicentini et al as evidence that quercetin can act as a sensor by changing the color of the fiber (whitening) and also attenuates UV by having a high antioxidant potential with respect to claims 9-14.

The Examiner relies on Vaquero as evidence that quercetin can act as an antibacterial agent with respect to claims 9-14.

As for claim 42, the Examiner states that Goodell suggests that one oxidant that may be used is permanganate [0023]. The term permanganate describes the anion present of a salt of permanganic acid.

In response to the argument that to arrive at the two claimed species of quercetin and kaemferol requires improper picking and choosing, the Examiner takes the position that a reference that clearly names the claimed species anticipates the claim no matter how many other species are named. In support of this position, the Examiner refers to MPEP §2131.02.

In response to the argument that the identified chelators do not expressly or inherently act as modifying agents and even if they did they would not provide the desired functional groups. The Examiner takes the position that Goodell teaches adding quercetin or kaemferol to lignocellulose along with peroxide and quercetin and kaemferol are the same species claimed in dependent claim 15. The Examiner further states that peroxide is an agent capable of causing modification as per instant claim 29. Thus, the Examiner concludes that Applicant has discovered that quercetin or kaemferol in addition to acting as redox cycling chelators also modify the surface of the fiber, which is not sufficient to overcome anticipation.

Applicants traverse the rejection and submit that the rejection is improper since the Examiner relies on improper “picking and choosing”. The law is clear on this point.. As previously noted, in order to anticipate a claim under 35 U.S.C. § 102, a reference must disclose within the four corners of the document not only all of the elements

claimed but also all of the elements arranged or combined in the same way as recited in the claim. *Net MoneyIn, Inc. v. Verisign, Inc.*, 2008 U.S. App. LEXIS 21827, 1, 27 (Fed. Cir. 2008).

In this case, Goodell fails to disclose a specific example which meets the modifying agent as required in the presently claimed invention. A person having ordinary skill in the art would have to pick and choose amongst the various exemplary chelators of Goodell to arrive at one of quercetin and kaempferol. Goodell does not teach all elements of the present claims and cannot be said to anticipate the present invention. The Examiner's position does not at all address the fact that Goodell fails to disclose a specific example which meets the modifying agent as required in the presently claimed invention.

Further, Goodell described the oxidation of lignocellulosic materials and organic compounds using hydroxyl radicals that are generated in mediated Fenton reactions. The aim of Goodell is to produce an efficient oxidation achieved with said hydroxyl radicals. The purpose of the mediator of Goodell is to bind metals and then "be reduced back to its reduced form" (page 6, [0093]). These "cycling" mediators are selected from compounds that do not exit the system by binding to a starting material or the product. Instead, the "cycling" mediators are selected from compounds that can be regenerated and reused. Therefore, the redox cycling chelators of Goodell do not expressly or inherently act as modifying agents as required by the presently claimed invention.

Further, even if the mediators of Goodell were to bind to the fibre, they would not provide the fibre with the desired functionalization.

Goodell does not expressly or inherently disclose each and every element of the presently claimed invention, and thus, does not anticipate the presently claimed invention.

Accordingly, withdrawal of the § 102 rejection is respectfully requested.

**B. Jaschinski et al**

Claims 1-6, 9-14, 23-31 and 41 are rejected under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. 6,136,041 JASCHINSKI et al., hereinafter JASCHINSKI.

In response to the arguments presented, the Examiner merely refers to previous arguments that Jaschinski fails to disclose chemical oxidizing agents that are salts and states that the claims were not amended in the Amendment filed August 23, 2010.

Applicants respectfully traverse for the reasons of record, which are incorporated herein by reference.

Further, Applicants note that the Examiner did not specifically address the arguments that were presented in the Amendment filed August 23, 2010, that the activator used in the present invention is different from the species used or formed in the Jaschinski. Applicants further noted that the oxidizing agent, e.g., APS, in the present invention reacts through a sulphate radical.

Specifically, in the present invention, the targeted reaction is the coupling of a phenoxy radical of a phenolic species to the fibre surface.

Jaschinski relates to chelator compounds, which can bind to a transition metal catalyst to decompose hydrogen peroxide to hydroxyl radicals according to the scheme:



The activator of the present invention is different from the species used or formed in the above reaction. For example, the APS mentioned as an exemplary oxidizing agent in the present application reacts through a sulphate radical.

In view of the above, it is submitted that the Jaschinski does not anticipate the present invention.

Accordingly, withdrawal of the § 102 rejection based on Jaschinski is respectfully requested.

### **C. Pedersen**

Claims 1-14, 16-21, 23-33, 35-39 and 41 are rejected under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent 6,187,136 PEDERSEN et al., hereinafter PEDERSON as evidenced by U.S. 2007/0163735 BUCHERT et al., hereinafter BUCHERT and Antibacterial activity directed isolation of compounds from *Onosoma hipidum* by NAZ et al., hereinafter NAZ.

Applicants traverse and respectfully request the Examiner to reconsider in view of the following remarks.

The present invention provides a way to functionalize the lignocellulosic fibres which, in turn, provides the fibres with properties foreign to the native fibre. More specifically, in the present invention, the oxidized fibre material is contacted with a modifying agent containing at least one first functional portion, which is compatible with the oxidized fibre material. The modifying agent is capable of providing the lignocellulosic fibre material with properties foreign to the native fibre.

Pederson does not disclose that the modified fiber is polymerized in the presence of an oxidizing agent in such a way that one end of the polymer chain is attached to the primed matrix of the fiber, as recited in the present invention.

Further, Pedersen does not describe the process or the aims of the present invention. The aim of Pederson is to achieve an improvement of the bond strength. Further, Pederson does not disclose a two-step process as disclosed in the present invention.

In view of the above, it is submitted that Pederson fails to anticipate the presently claimed invention.

Accordingly, withdrawal of the § 102 rejection based on Pederson is respectfully requested.

**D. Garnett**

Claims 1 and 30 are rejected under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. 3,522,158 GARNETT, hereinafter GARNETT.

According to the Examiner, Garnett discloses exposing lignin containing fibers to radiation [column 3, example 4] to graft styrene to said fibers. Styrene is compatible with (i.e., grafts to) the lignocellulosic fiber and provides properties foreign to the fiber including increased alkali resistance and acid resistance [column 4, lines 10-20]. The Examiner further asserts that Garnett includes multiple other compounds including acrylonitrile and vinyl pyridine [column 2, lines 5-11] both species of which add nitrogen content to the fiber.

Garnett teaches a process for the production of graft polymers by ionizing radiation, wherein a hydrophilic backbone, i.e., cellulose in the form of paper, fibers, etc., is irradiated in the presence of a monomeric vinyl compound polymerizable by free radical or ionic mechanism in a solvent. However, Garnett does not disclose, teach or suggest all elements of the claimed invention.

Accordingly, Applicants respectfully request withdrawal of the anticipation rejection based on Garnett.

#### **IV. Claim Rejections - 35 USC § 102/103**

Claims 22 and 40 are rejected under 35 U.S.C. §102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over 6,187,136 PEDERSEN et al., hereinafter PEDERSON for the reasons of record.

Applicants traverse and respectfully request the Examiner to reconsider in view of the following remarks.

The Examiner's position on this rejection raises the same issues as presented by the § 112, second paragraph, rejection set forth above, and thus, it is respectfully requested that the rejection be withdrawn for the reasons set forth in response to the § 112 rejection.

In particular, in the present invention, the laccase activity was determined as described above, and under the assay conditions at which the enzyme activity was measured, the ranges of Pederson do not overlap with those of the present invention.

Accordingly, withdrawal of the § 102(b) or, in the alternative, § 103(a) rejection of claims 22 and 40 based on Pederson is respectfully requested.

#### **V. Conclusion**

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below. The USPTO is directed and authorized to charge all required fees,

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except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880.

Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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